

Specification for

Smoke density indicators and recorders

Co-operating organizations

The Solid Fuel Industry Standards Committee, under whose supervision this British Standard was prepared, consists of representatives from the following Government departments and scientific and industrial organizations:

- Association of Consulting Engineers
- British Cast Iron Research Association
- British Coal Utilisation Research Association
- British Coke Research Association
- British Electrical and Allied Manufacturers' Association
- British Ironfounders' Association
- British Mechanical Engineering Confederation Limited
- British Steel Industry*
- Chamber of Coal Traders
- Chemical Industries Association
- Coal Utilisation Council
- Coke Oven Managers' Association
- Council of Ironfoundry Associations
- Domestic Solid Fuel Appliances Approval Council
- Electricity Council, the Central Electricity Generating Board and Area Boards in England and Wales*
- Gas Council*
- Heating and Ventilating Contractors Association
- Imperial Chemical Industries Limited
- Institute of British Foundrymen
- Institute of Fuel*
- Institution of Gas Engineers*
- Institution of Heating and Ventilating Engineers
- Institution of Mechanical Engineers
- Low Temperature Coal Distillers' Association of Great Britain Limited
- Ministry of Housing and Local Government
- Ministry of Public Building and Works
- National Coal Board*
- Society of British Gas Industries
- Water-tube Boilermakers' Association*
- Women's Advisory Council on Solid Fuel

The scientific and industrial organizations marked with an asterisk in the above list, together with the following, were directly represented on the committee entrusted with the preparation of this British Standard:

- British Industrial Measuring and Control Apparatus Manufacturers' Association
- Combustion Engineering Association
- Engineering Equipment Users Association
- National Industrial Fuel Efficiency Service
- Scientific Instrument Manufacturers' Association

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Foreword

This standard makes reference to the following British Standards:

BS 89, *Electrical indicating instruments*.

BS 90, *Graphic (recording or chart-recording) ammeters, voltmeters, wattmeters, frequency meters, and power-factor meters*.

BS 2643, *Glossary of terms relating to the performance of measuring instruments*.

BS 2740, *Simple smoke alarms and alarm metering devices*.

BS 2741, *Recommendations for the construction of simple smoke viewers*.

BS 2742, *Notes on the use of the Ringelmann and miniature smoke charts*.

The need for means whereby smoke emission may be controlled and limited has been set out in the Report by the Committee on Air Pollution, Cmd. 9322, published by H.M. Stationery Office in November 1954, and the devices described in this standard are intended to satisfy the recommendations of Paragraph 35 of that report. The report has resulted in the passing of the Clean Air Act, Section 4 of which is particularly relevant. The devices described are intended to apply to black or grey smoke caused by the incomplete combustion of carbonaceous matter.

Paragraph 95 of the Report Cmd. 9322 refers to the use of the Ringelmann chart as a means of assessing smoke density and details of this together with instructions for its use are given in BS 2742¹⁾.

For control of smoke it is preferable to use an instrument, such as one in which a beam of light projected across the chimney is partially obscured by the smoke-laden gases. Simple smoke alarms based on this principle are specified in BS 2740²⁾ and are intended to give visible or audible warning when the density of smoke approaches the statutory limit. The present specification describes a more comprehensive type of instrument which provides a continuous indication of smoke density. This type of instrument, particularly when installed on individual furnaces, is also an aid to the maintenance of efficient combustion.

Such instruments may be calibrated to show either the percentage obscuration caused by the smoke-laden gases or their optical density.

The relationship between this reading and the estimated density of smoke using the Ringelmann chart will depend upon the dimensions of the individual plant, and also upon the nature and colour of the smoke and the limitations of the Ringelmann method. For this reason the instrument cannot be calibrated in terms of the Ringelmann scale prior to installation. For guidance, the meter can be marked at the reading equivalent to maximum permissible smoke by tests carried out on site after installation. The setting of any alarm that may be fitted will normally be at some reading below this.

The instruments specified in this standard may consist of five main parts, 1) a light source, such as a lamp and projection system producing the beam of light, 2) a receiving unit, 3) an indicating instrument, 4) a recording instrument and 5) an alarm, preferably both visible and audible.

The performance prescribed in this British Standard is not to be understood as representing the highest degree of precision which can be attained with British instruments. It has been thought best to fix such limits as will ensure that the types of instrument in common use will comply with the specification when in good order and used under the conditions recommended. In order to keep abreast of progress in instrument design, the standard will be reviewed at frequent intervals and revised when necessary, by the issue either of amendment slips or of revised editions.

¹⁾ BS 2742, "Notes on the use of the Ringelmann and miniature smoke charts".

²⁾ BS 2740, "Simple smoke alarms and alarm metering devices".

The attention of the reader is also drawn to BS 2741³⁾, which gives recommendations for the construction of very simple smoke viewers. In these, the intensity of the transmitted light is observed by the operator either directly or from the brightness of a translucent screen placed in the light beam. Such simple devices are not recommended as standard instruments, but may be used to supplement the information obtained by an alarm or indicator. For example, a number of furnaces on one chimney may be equipped with a single smoke indicator on the chimney to show the total emission and a simple visual device for each furnace for the guidance of the operator.

This revision does not alter the technical requirements of the specification but expresses the values in metric terms.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i to iv, pages 1 to 6 and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

³⁾ BS 2741, “Recommendations for the construction of simple smoke viewers”.